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06821/06258

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Yolonda S. Toth
SIGNATURE
Yolonda S. Toth

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Simonelli, et al.	)	Examiner: W. Yip
Serial No.:	09/874,801	)	Art Unit: 3637
Filed:	June 05, 2001	)	
For:	**MOISTURE AND CONDENSATION BARRIER FOR BUILDING STRUCTURES**	)	Attorney Docket No.: 06821/06258

Rule 1.132 Declaration of Abdul Razzak

Dear Sir:

I, Abdul Razzak, am experienced in the chemical arts, and state as follows:

1. I received my Bachelor's Degree in Chemical Technology/Chemistry from Punjab University, in Lahore, Pakistan in 1963. I received my M.S. in Chemical Technology/Chemistry from Punjab University, Lahore, Pakistan, in 1965. Thereafter, I was employed at Polymer Plastic/Vitricon, Long Island, NY as Chief Chemist for 3 years. Thereafter I was employed at Marson Corporation, Chelsea, Mass., as Technical Director for 10 years. In 1982 I accepted a position at Bondo Corporation, Atlanta, Georgia, where I am presently a Vice President of New Products & Applications.

2. Rubber is an elastomeric polymer and is available in either natural or synthetic form. Rubber is not a plastic. Materials made with rubber sometimes share certain physical characteristics with elastomeric plastics. Natural rubber is polyisoprene, and is obtained from certain species of plant (Heavea tree). Synthetic rubber is made from hydrocarbons and other chemical groups and comes in many forms, such as polychloroprene, (neoprene), styrene butadiene, etc. Modified rubber is made by curing natural or synthetic rubber polymers, or combinations thereof.

3. Liquid rubberized formulations (for example, liquid rubberized coating materials) contain rubber polymers, and may also contain additives that enhance fluidity or have other useful properties. These formulations are cured into modified rubber solids by various methods such as drying, or through chemical reactions that irreversibly modify the rubber polymers. One method of curing is by evaporation of volatile solvents in the formulation, resulting in solidification of the rubber. Another method of curing rubber is vulcanization. Vulcanization is a physiochemical change or chemical reaction that requires sulfur and heat, and results in the formation of crosslinkages between sulfur molecules and rubber polymers. Another method of curing involves chemically cross linking rubber polymers with chemicals other than sulfur.

4. I am familiar with liquid plastic formulations and the solid plastics made with such formulations. The term "plastic" is used to refer generally to a material that is malleable and moldable and deforms when heated. "Plastic" may also be used to generically refer to specific types of synthetic materials that fall into the major categories of thermoplastics, thermosetting plastics, and elastomeric plastics. For example, polypropylene is a plastic that falls in the category of thermoplastics.

5. I have read Application for U.S. Patent 2001/0049917 (the "Simonelli application") and I am familiar with the liquid rubber formulations described therein. That application discloses a formulation for a liquid rubberized coating material that includes rubber polymers in solution with a volatile solvent, for example methylene chloride, and other agents, such as petroleum distillates. That application also describes two examples of commercially available liquid rubberized coatings made with synthetic rubbers, Dynatron Dyna-Pro Rubberized Undercoat, and Mar-Hyde Paintable Rubber Undercoating, both of which are products of my employer, Bondo Corporation.

6. I have worked with and tested the liquid rubberized coating materials, and the solidified modified rubber coatings described in the Simonelli application. The coating materials do not require vulcanization; they are easy to apply, and cure relatively quickly by drying under ambient conditions. Once cured, the modified rubber coatings are easy to handle, are non-tacky, and are very resistant to cracking when the coated substrate is flexed

or bent. They do not crack, peel, soften or pull away from the substrate after repeated exposure to moisture, and freeze/thaw or heating/cooling conditions.

7. I have read U.S. Patent 4,242,390 (the "Nemeth patent"). The Nemeth patent mentions use of the following materials: a water-repellent wax such as ozocerite wax; a plastic in the form of a thermoplastic material such as ethylene vinyl acetate copolymer; a dried varnish such as vinyl chloride, vinyl acetate copolymer; or a plastic in the form of a thermosetting resin such as polyurethane. None of these materials are the same as modified rubber and none of them includes rubber as a component of the formulations mentioned.

8. I have read U.S. Patent 6,179,942 (the "Padmanabhan patent"). The Padmanabhan patent describes the following materials: carbon or aramid fibers set in a matrix such as an epoxy resin; vinyl ester; phenolic resin; polyester; polypropylene; and polyamide. I am familiar with these materials; none of these materials are the same as modified rubber and none of them includes rubber as a component.

9. I have read U.S. Patent 6,136,408 (the "Radcliffe patent"). The Radcliffe patent describes two plastics formulations, methylene diphenyl diisocyanate or polymeric methylene diphenyl diisocyanate and polyols, which are the basic components for making polyurethane. Neither of the formulations mentioned for making the polyurethane includes rubber as a component and the coatings are not modified rubber.

10. I have read German Patent No. 195,20,567 (the "Genshow patent"). The Genshow patent describes coating materials in the form of clear thermosetting epoxide and polyurethane resins. These coating materials do not include rubber as a component and the coatings are not modified rubbers.

11. I have read Japanese Patent No. 7-268970 (the "Japanese patent"). The Japanese patent describes a coating material in the form of an amino alkyd resin. I am familiar with this material; it is not a modified rubber is does not include rubber as a component.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that

such willful false statements may jeopardize the validity of the application or any patent issued thereon.

6/25/03
Date

Abdul Razzak

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In re application of: Simonelli, et al.	)	Examiner: W. Yip
Serial No.: 09/874,801	)	Art Unit: 3637
Filed: June 05, 2001	)	
For: **MOISTURE AND CONDENSATION BARRIER FOR BUILDING STRUCTURES**	)	Attorney Docket No.: 06821/06258

Rule 1.132 Declaration of Peter Simonelli

Dear Sir:

I, Peter Simonelli, one of the inventors of the above-identified application, state as follows:

1. **Experience:** For more than 20 years I have been in the business of designing and constructing custom hardwood floors in residences and other structures.

2. **The Problem – Moisture:** In all building structures there are problems with water penetration and damage. One source of moisture entry in buildings is through the floor, either by passage through a concrete slab, or by vapor transfer from an unfinished crawl space. There is a fundamental problem in particular with subfloor radiant heating systems. It is an unavoidable reality that these systems often release moisture into the surrounding structure. Moisture can be released either in the form of condensation that forms on the tubing system, or in the form of leaks or ruptures within the system. Released moisture from any source can and does cause damage to and ultimate loss of custom hardwood floors. To avoid these very costly losses, moisture barriers are an essential part of my flooring systems.

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3. **The Solution – Moisture Barriers:** Prior to developing the flooring systems and construction materials as described in our patent application, I had tried several different moisture barriers that were used in the trade to protect against moisture penetration in general, or for use specifically with subfloor radiant heating systems.

4. **Failed Attempts – Plastic Sheets:** I have tried a 6 mil plastic sheet under a subfloor and above a radiant heating system. This system was recommended by the National Standard of Hardwood for the installation of Hardwood Floors over radiant heating systems. Approximately eight months after installation, the hardwood flooring had warped and buckled. When I went back for the warranty work and tore out the flooring material, I measured the moisture content of the sub floor and found it to be 14%. An acceptable moisture level for the geographic location of the structure is from about 6-8%. Thus, according to my building standards, the sub floor was excessively moist. I removed the sub floor and found that the plastic sheet had melted and degraded due to the high temperatures of the radiant heating system. This system failed.

5. **Failed Attempts – Epoxy Coated Concrete:** I have tried an epoxy resin over a concrete slab on grade with a radiant heating system to seal the slab and prevent the movement of moisture and condensation from the slab into the subfloor and hardwood flooring. This system was recommended by the General Contractor. I researched this method with different concrete companies on the proper technique to seal a concrete slab with radiant heating systems. Once the epoxy resin was applied to the concrete slab, I installed a floating sub floor (sheets of tongue in groove plywood that are not mechanically fastened to the concrete slab) and hardwood flooring. Approximately five months after installation, the hardwood flooring had warped and buckled. When I went back for the warranty work and tore out the flooring material, I noticed that the epoxy resin coating had developed extensive cracking due to the high temperatures of the radiant heating system. I measured the moisture content of the sub floor to exceed 25% (again, in a geographic location where 6-8% is acceptable.) This system failed.

6. **Failed Attempts – Plastic (Polyurethane) Coated Subfloor:** I have tried a polyurethane resin pre-coating. This polyurethane resin was coated on the under side of the subfloor boards prior to installation over a radiant heating system. Hardwood flooring was installed over the subfloor. This system was recommended by a Hardwood Flooring Company that had experience with radiant heating systems. Approximately nine months after installation, the hardwood flooring had warped and buckled. When I went back for the warranty work and tore out the flooring material, I noticed that the polyurethane coating had developed extensive cracking due to the high temperatures of the radiant heating system. I measured the moisture content of the sub floor to be about 14-18% (again, in a geographic location where 6-8% is acceptable.) This system failed.

7. **Understanding the Failures:** I conducted further research to understand what was causing failures with the moisture barriers I had tried. I learned it was likely that the plastic (polyurethane and epoxy resin) coatings and plastic sheets degraded and cracked due to the high temperatures of the radiant heating system. I also learned that temperature- and moisture- dependent expansion and contraction of the sub floorboards also contributed to the failure of the coatings I had tried. Not only were the coatings unable to resist the effects of the direct heat, they were likewise not flexible enough to tolerate the expansion and contraction of the wood boards through heating and cooling cycles.

8. **The Invention:** After experiencing so many failures with these various moisture barriers, I realized a new solution and product was needed to solve the moisture and condensation problems in hardwood flooring systems. I found at the hardware store various liquid rubberized coatings, some of which are used for automotive and marine applications. After testing some of these materials, I determined that they had many unique properties, some of which could be useful in my flooring applications. In particular, I found that these coatings were waterproof, very resistant to heat, could bond to the surface of wood, and were elastic. This is how my invention began.

9. **Success – Example 1:** I contacted Bondo Corp. to obtain a sample of one of their products, #9706 Rubberize Undercoating, for an experiment in the home of one of my

collaborators. I pre-coated the rubberized coating directly to the sub floorboards which were to be used in a flooring system. No special curing, such as vulcanization was needed. I allowed the boards to dry under ambient conditions. I then installed the boards coated with the cured, liquid rubberized coating over an encased radiant heating system, with the moisture barrier facing toward the heating system (the source of potential moisture and condensation). A hardwood floor was installed over the coated subfloor boards. After 17 months, the hardwood floor remains intact and there is no evidence of any moisture penetration to the hardwood floor. This system has not failed.

10. Success – Example 2: I also used the invention to retro-design a hardwood floor located over an unsealed, damp crawl space. I first removed the hardwood flooring. I then applied the liquid rubberized coating to the sub floor boards, with the moisture barrier facing away from the source of the moisture. Again, no special curing, such as vulcanization was needed. I allowed the boards to dry under ambient conditions. I then reinstalled the hardwood floor over the coated subfloor boards. After nine months, the hardwood floor remains intact and there is no evidence of any moisture penetration to the hardwood floor. This system has not failed.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Peter Simonelli